Exabyte Field Instruction
December 2000

Upgrading the Exabyte 220 or 440/480 Libraries From Mammoth to Mammoth-2 (M2) Tape Drives

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Revision History

000	March 2000	Initial release.
001	December 2000	Added important active termination note.

1 Getting Started

These instructions explain how to remove Exabyte Mammoth tape drives from an Exabyte 220, Exabyte 440, or Exabyte 480 library and replace them with Exabyte Mammoth-2 (M2™) tape drives. Upgrading the library requires the following:

- Removing the existing Mammoth tape drives
- Installing the new M2 tape drives
- Upgrading the library firmware

These instructions also provide important information about operating your library with M2 tape drives. For more information about operating the library with M2 drives, visit the Library of Technical Publications on the Exabyte web site (www.exabyte.com) to view the latest version of the library installation and operation manual.

➤ **Important** If you are installing an M2 HVD (high-voltage differential) drive, you must use active termination. Active termination is required for each SCSI bus that has an M2 HVD drive on it. Exabyte recommends an AMP 750897-1 or equivalent terminator for use with the M2 HVD drive. This requirement only applies to M2 tape drives that are high-voltage differential (HVD).

These instructions use the following conventions:

- Keys shown boldfaced and in brackets (for example, **[Enter]**) are keys you press on your host computer's keyboard.
- Words shown in Courier (for example, `chsterm`) are commands you type.
- Boxed keys (for example, [Escape]) indicate keys you press on the library's operator panel.

Note: In these instructions, *tape drive* refers to a tape drive installed in a drive carrier.

2 Required Hardware and Software

This procedure requires the following:

- An Exabyte M2 tape drive installed in a drive carrier (included in this kit).
- The latest version of the library firmware, which you need to download from the Exabyte web site (www.exabyte.com).
- A computer system with the following requirements:
  - IBM compatible.
  - DOS version 3.3 or greater or Win95 or later.
  - Serial port, set up as COM1 through COM4; if you have PS/2, it may be set up as Serial 1 through Serial 8.
  - 25-pin to 9-pin adapter (available from most computer stores), if the computer serial port has a 25-pin connector.
- A 9-pin straight-through serial cable (not a null modem cable).
- A flat-blade screwdriver (some models of the library may require a # 1 Phillips screwdriver).

- A software program that supports XMODEM data transfer protocol and has the options in the following table set as shown (if applicable to your program).

  Note: Exabyte provides a PC-based program, CHS Terminal, that supports the required protocol. CHS Terminal is available on the Exabyte web site (www.exabyte.com).

Option	**Setting**
Port setting: Data bits	8
Port setting: Parity	None
Port setting: Stop bits	1
Port setting: Flow control	None
Function, arrow, and control keys act as	Terminal keys
Emulation	ANSI
Data transfer protocol (for writing)	XMODEM
Font	Terminal
Baud Rate	Up to 19,200

3 Protecting From ESD

Make sure that the maintenance environment is free of conditions that could cause electrostatic discharge (ESD). If possible, use an antistatic mat and grounded static protection wrist band during this procedure. If a mat and wristband are not available, touch a known grounded surface, such as the computer's metal chassis.

4 Removing the Mammoth Tape Drives

To remove the Mammoth tape drives already in your library, do the following:

1. If there is a cartridge in any tape drive, remove it by opening the library door and pressing the tape drive's eject button. Leave the door open after you eject the cartridge.

2. Power off the library and disconnect the power cord.

WARNING!

Before performing any of the following steps, be sure that the power switch is off and the power cord is disconnected from the library.

3. If necessary, push firmly against the base of the robot to move it so it is not blocking access to the tape drives.

4. Through the front of the library, use a flat-blade screwdriver (some models may require a # 1 Phillips) to loosen the two captive screws on the drive carrier faceplate (see Figure 1).

CAUTION

Do not lift the lever on the drive carrier faceplate without first loosening the captive screws.

5. Using your finger, lift the lever on the drive carrier faceplate (shown in Figure 1) to extract the carrier from the controller card connector at the rear of the drive slot.

6. Slide the tape drive out of the drive slot.

7. Repeat steps 4 through 6 for the remaining drives.

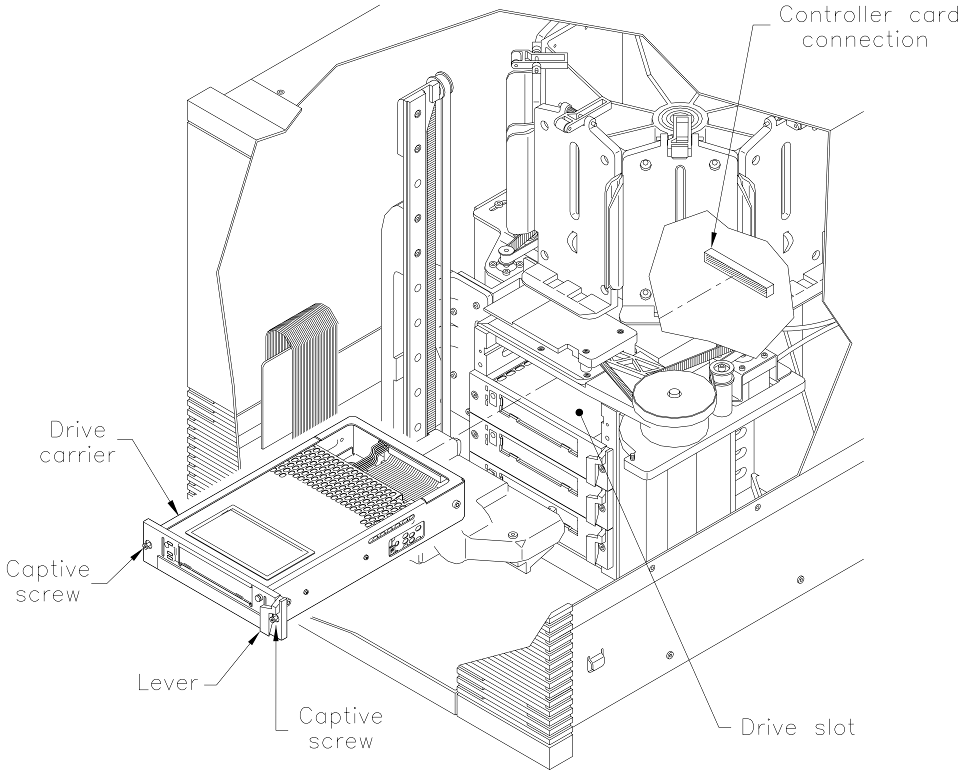


Figure 1 Removing the Mammoth tape drives (Exabyte 480 library shown)

5 Installing the M2 Tape Drives

CAUTION

You cannot mix tape drive models or SCSI configurations (low-voltage differential versus high-voltage differential) within your library. Mixing tape drive models could result in data loss or tape drive failure.

Exabyte M2 tape drives are installed in drive carriers specially designed for these tape drives. Do not attempt to install M2 tape drives in drive carriers for other 8mm half-high tape drives.

If you operate your library with less than the full capacity of tape drives, you must install drive blanks over the unused drive slots. Failure to install a drive blank will disrupt air flow within the library. Do not place an empty drive carrier into a drive slot in the library. Contact Exabyte to purchase a drive blank.

When handling the tape drive, be careful not to insert your fingers into the drive door.

To install an M2 tape drive, follow these steps:

1. From the front of the library, insert the tape drive into the slot with the lever to the right (Exabyte 220 standalone model or Exabyte 440/480 libraries) or down (Exabyte 220 rack-mount model). Make sure the lever is closed (flat against the faceplate). The tape drive should slide easily toward the back of the library. Use the alignment pins on the back of the faceplate for guidance.

2. When the tape drive is almost completely inside the drive slot, you will feel some resistance. This is caused by the 128-pin connection between the library's controller card and the tape drive. To seat the connection, push firmly against the drive until you can push no further.

3. Using a flat-blade screwdriver, tighten the captive screw on each side of the drive carrier faceplate. Make sure the back of the drive carrier faceplate is snug against the face of the drive slot.

4. Repeat steps 1 through 3 for the remaining tape drives.

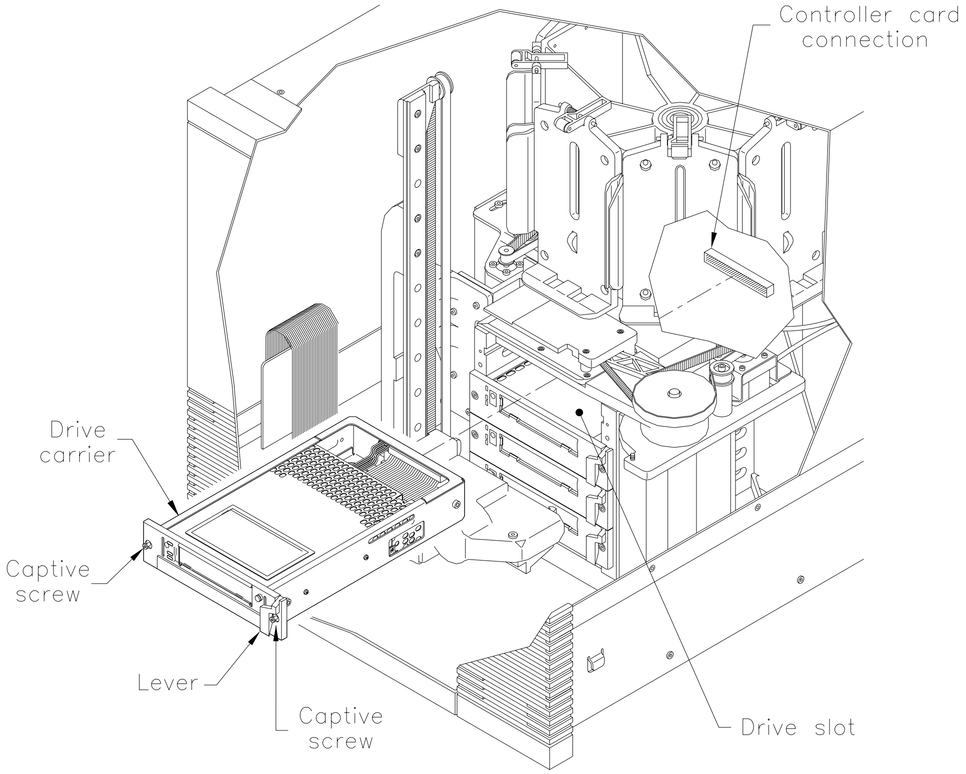


Figure 2 Installing M2 tape drives (Exabyte 480 library shown)

CAUTION

Due to the extremely high speed of the M2 drives, library operation may halt if you do not use active termination with M2 HVD drives. If this happens, you will need to power the library off and on to resume operation. Exabyte recommends an AMP 750897-1 or equivalent terminator for use with the M2 HVD drive.

6 Loading the New Firmware

After installing the M2 tape drives, you must load new library firmware. You can use the library's serial port and a terminal emulation program (such as CHS Terminal) to access the library's current Diagnostics firmware.

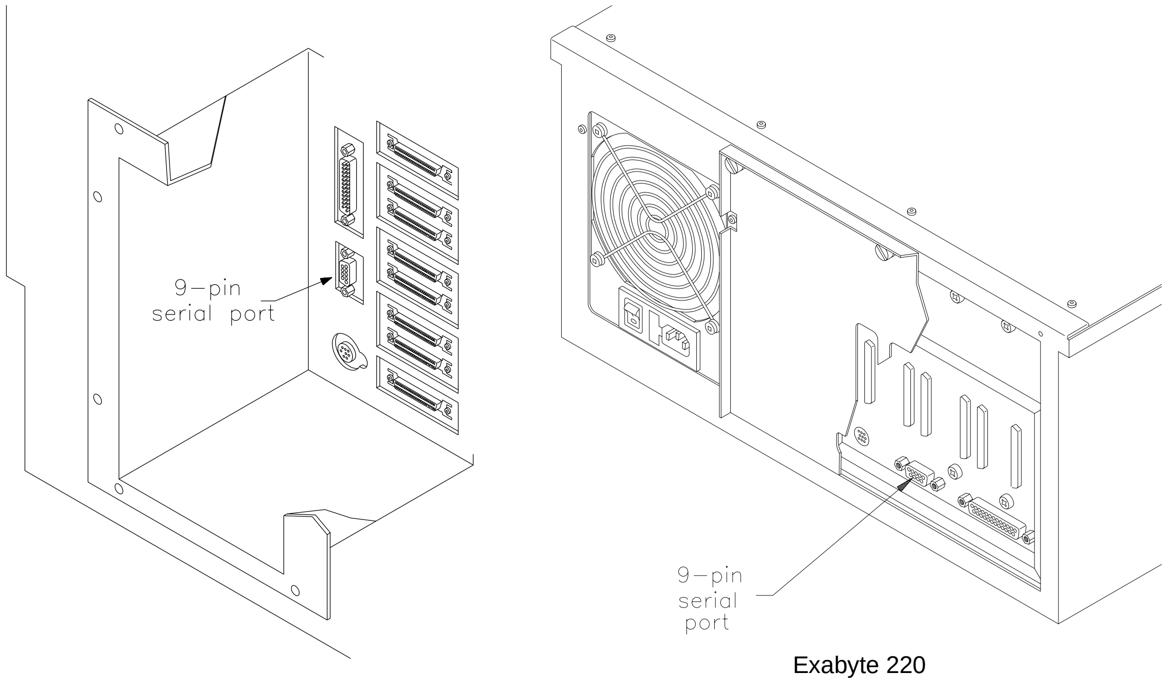
Connecting the 9-pin cable

To connect the 9-pin cable, follow these steps:

1. Power off the library and disconnect the power cord.

2. If your host computer only has a 25-pin serial port, install a 25-pin to 9-pin adapter.

3. Connect the 9-pin cable to the back of the library and to the host computer. The following figure shows the location of the 9-pin serial port on the back of the Exabyte 440/480 or Exabyte 220.



Exabyte 220

Exabyte 440/480

Figure 3 Diagnostic port (rear view of the libraries)

4. Connect the power cord and power on the library. The library and tape drives perform their power-on self-tests (POST), and the Main Screen appears on the library LCD.

Note: When you replace a tape drive, the new tape drive automatically assumes the SCSI ID of the old tape drive.

If the library does not power on…

Check the following:

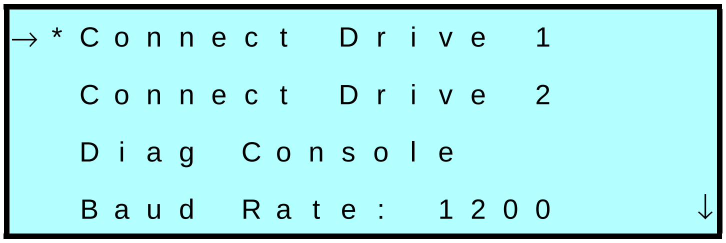
- Is the power cord inserted correctly?
- Are the SCSI cables connected?
- Is the host powered on?
- Is the SCSI bus terminated correctly?
- Are the drive carriers firmly seated in the controller card connector at the back of the drive slot?

If problems persist, refer to the installation and operation manual for your library.

Configuring the serial port

To configure the serial port from the operator panel:

1. If necessary, disable security (refer to your installation and operation manual for more information).
2. From the Interface Menu, press [*3*] or [*4*] to select Config 25/9-Pin. The following LCD screen appears:



```
→*Connect Drive 1
  Connect Drive 2
  Diag Console
  Baud Rate: 1200      ↓
```

Note: An asterisk (*) indicates the current connection.

The number of tape drives listed on your screen depens on the number of tape drives installed in your library.

3. Select Diag Console. The system configures the port and displays a confirmation message. Press [Escape] to exit this message.

4. Press [*3*] or [*4*] to assign a baud rate to the port and press [Enter]. An asterisk indicates the current baud rate.

➤ **Important** Make sure the baud rate set on your host is the same as the baud rate set on the library.

Reading and writing firmware

The read operation reads your existing firmware and saves it in a file on your host computer's hard disk. If you receive a bad checksum error after writing new firmware, you can restore the old firmware using the file you create during the read operation.

Note: Make sure you have at least 530 kilobytes of free space on your hard disk before performing a read firmware operation.

The write operation writes the new firmware from the file into the library's EEPROM.

CAUTION

Because of memory limitations, the library cannot validate the new firmware data before erasing and reprogramming the flash EEPROM. If the checksum calculated by the library after the write operation does not match the embedded checksum, the new firmware is unusable. Therefore, before performing the write firmware operation, perform the read firmware operation to save your existing firmware on your host computer.

To upgrade the library's firmware, follow these steps:

1. If necessary, disable security.

2. From your host computer, access the software you are using to communicate with the library. If you have CHS Terminal, type `chsterm` in the directory where you installed the program.

3. If your monitor displays a blank screen with function keys along the top, type **[m]** to display the Console Main menu.

   Note: If garbled characters appear on your screen, make sure you have set the same baud rate for the host and the library.

4. From the Console Main screen, type **[t]**. In response to the prompt, type **[y]** to go to the ROM Console Main screen.

5. From the ROM Console Main screen, type **[m]** to access the ROM Console menu.

6. From the ROM Console menu, type **[v]** to read firmware.

7. Enter the path and filename on your host computer's hard disk where you want the read command to save your current firmware, and press **[Enter]**. (In CHS Terminal, type **[Alt-D]**, type in the path and firmware name, and press **[Enter]**.)

   When the firmware read is complete, the system displays the message: **File received successfully**, resets the library, and performs POST.

8. Repeat steps 4 and 5 to return to the ROM Console menu.

9. From the ROM Console menu, type **[w]** to write new firmware. The system displays an outline of the procedure.

10. Type **[y]** to continue. The system prompts for the path and filename of the new firmware.

11. Use your communications program to specify the path and filename of the firmware you downloaded from Exabyte's web site. (In CHS Terminal, type **[Alt-S]** and the path and filename of the firmware. If necessary, you can use wild cards, *.*, and press **[Enter]** to search your drives and directories for the filename.) When you have selected the filename, press **[Enter]**. The system initiates the firmware upgrade and displays its progress on the screen.

12. When the upgrade is complete, the system transfers control to the new flash EEPROM code, and then performs POST.

13. Press any key to return to the Console Main screen or press **[m]** to return to the Console Main menu.

7 Operating Your Library with M2 Tape Drives

This section answers some questions you might have about operating your library with the M2 tape drives. If you have questions that are not answered here, contact Exabyte Technical Support at 1-800-445-7736 or 1-303-417-7792.

Selecting data cartridges

The M2 tape drive uses Exabyte AME 8mm Cartridges with SmartClean™. Exabyte AME SmartClean cartridges were designed specifically for M2 and provide the automatic cleaning capability that eliminates the need for a separate cleaning cartridge. The following table shows the available media lengths and their capacities:

Length of AME SmartClean tape	Maximum capacity (native)	Maximum capacity (2.5:1 compression)
225m	60 gigabytes (GB)	150 GB
150m	40 GB	100 GB
75m	20 GB	50 GB

For best performance, always use Exabyte SmartClean cartridges in your M2 library. To order Exabyte SmartClean cartridges, call 1-800-774-7172 or 1-800-392-8273.

Using data cartridges without SmartClean

If necessary, you can use M2 to write to Exabyte's original AME cartridges without SmartClean. However, we highly recommend that you switch *exclusively* to SmartClean cartridges for the following reasons:

- Exabyte SmartClean cartridges will give you the best performance and greatest data integrity because they were specifically designed for M2.
- The original Exabyte AME cartridges do not have the built-in SmartClean system. If you use these cartridges extensively, you must clean your M2 tape drives with a separate cleaning cartridge.
- If you write to a non-SmartClean tape with M2, then write to the same tape with Mammoth or Mammoth-LT, you will overwrite the M2 data. Mammoth and Mammoth-LT do not recognize the Mammoth-2 data format and treat cartridges written in this format as blank.
- Future MammothTape technology drives beyond M2 may not support AME cartridges without SmartClean.

Reading cartridges written by Mammoth or Mammoth-LT

To allow you to easily access data written by Mammoth and Mammoth-LT, M2 can read the non-SmartClean AME cartridges written by these drives.

The following table summarizes M2's support for Exabyte cartridges:

Exabyte AME with SmartClean **225m, 150m, and 75m**	**Exabyte AME** **170m, 125m, 48m, and 22m**	**Exabyte MP** **160m XL, 112m, 54m, and 15m**
M2 reads and writes Mammoth-2 format	**M2 reads**[a] Mammoth format (written by Mammoth or Mammoth-LT) **M2 reads and writes** Mammoth-2 format	M2 does not support[b]

[a] Initial shipments of M2 require a firmware upgrade to support this function.

[b] If you have MP cartridges written by older Exabyte 8mm drives and want to move your data to Exabyte AME SmartClean cartridges, you can use Exabyte's Media Conversion Service (1-800-445-7736).

Cleaning the M2 tape drive

If you *always* use Exabyte SmartClean AME cartridges, you should never need to use a separate cleaning cartridge to clean the M2 drives in your library. M2 automatically performs its cleanings using the specially formulated cleaning material located at the beginning of each SmartClean cartridge. With M2 and SmartClean, you do not need to use one of the slots in your library to store a cleaning cartridge.

The only situation in which M2 requires cleaning with a separate cleaning cartridge is during extensive use of non-SmartClean AME cartridges. While this type of use is not recommended, it may be unavoidable in some situations. When non-SmartClean cartridges are used in M2 for a long period of time, automatic cleanings cannot take place. Under such circumstances, when the drive's internal monitoring system determines it needs cleaning, it will request cleaning with an Exabyte Mammoth Cleaning Cartridge (part number 315205). If you plan to use non-SmartClean cartridges extensively, be sure to store an Exabyte Mammoth Cleaning Cartridge in the fixed cartridge slot in your library.